

Problem Solving

Reporting Category Computation and Estimation

Topic Solving single-step and multistep practical problems

Materials

- Problem-Solving Mat (attached)
- Word problems

Vocabulary

fraction, mixed number, improper fraction, like denominators, unlike denominators, estimation, simplify, simplest form, factor, least common denominator, common factors, common multiples, greatest common factor (GCF), least common multiple (LCM), sum difference, decimal, tenths, hundredths, thousandths, decimal point, leading zero, place value

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Begin by asking students to consider how they typically solve a problem in their everyday lives. Do they just do something without thinking, do they get suggestions and opinions from others, do they look at their options? Discuss the importance of connecting the math they are studying to real-life situations. Ask students what kind of questions they need to ask themselves when confronted with a math problem. Ask what they think about when solving such problems. Lead them to realize that they should ask themselves: “What do I know? What do I want to know? What clue words are given to indicate which operation to use? What should I do to find the answer? Does the answer make sense?”
2. Distribute copies of the Problem-Solving Mat. Give the class a word problem to solve, and walk through the steps with them. For example: “Sandy ran 3.5 miles each day for 12 days. Mary ran 2.7 miles each day for 10 days. How many more miles did Sandy run than Mary?”
 - What do I know from the statement of the problem? (miles per day and number of days each girl ran) Have students write this information in the appropriate box on their mats.
 - What do I want to know first? (total number of miles each girl ran)
 - What clue words are given to indicate which operation to use? (“__miles each day for __days”) Have students write these words on their mats. Lead a discussion in which students conclude that they must *multiply* to find out the total number of miles each girl ran. Have students show this multiplication in the first SOLVE box on their mats.
 - What do I still want to know? (how many more miles Sandy ran than Mary)
 - What clue words are given to indicate which operation to use? (“How many more”) Have students write these words on their mats. Lead a discussion in which students conclude that they must *subtract* to find out how many more miles Sandy ran than

Mary.) Have students show this subtraction in the second SOLVE box on their mats and then write the answer to the problem in the last box.

- Have I included everything?
 - Does the answer I've gotten make sense? Do I have the correct units? Is there a way to confirm that my answer is correct?
3. This process works for single-step and multistep problems. It is important to help students learn how to “think through” problems in order to solve them.
 4. Consider sharing some other ideas with your students for problem solving, such as the following:
 - Draw a diagram or picture.
 - Act the problem out, step-by-step.
 - Make a systematic list, chart, or table.
 - Look for a pattern.
 - Simplify the problem—i.e., try it with smaller numbers.
 - Restate the problem in another way, or look for a related problem.
 - Think about “Before” and “After” situations.
 - Work backwards.
 - Guess and check—i.e., try something and see if it works.

Assessment

- **Questions**
 - What is the purpose of the Problem-Solving Mat? Does it help you organize your thoughts in a logical manner?
- **Journal/Writing Prompts**
 - Create a chart in your journal of addition and subtraction operational terms that you might find in word problems and that will help you determine whether to add or subtract.
 - Write a single-step or multistep word problem in your journal, and trade with a friend to solve.

Problem-Solving Mat

READ

What information do you *know* from the problem?

THINK

Clue Words & Operations

SOLVE & CHECK

The 'SOLVE & CHECK' section consists of three large, empty rectangular boxes arranged horizontally. The first box is on the left, the second in the middle, and the third on the right. A large, hollow arrow points from the first box to the second, and another large, hollow arrow points from the second box to the third, indicating a sequential process.